CLIMATE CHANGE ADAPTATION

DECISION SUPPORT FOR USAID PROJECTS

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DECISION SUPPORT FOR USAID PROJECTS

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CONTENTS

EXECUTIVE SUMMARY

Climate change and variability pose potentially significant threats to the benefits of many types of USAID projects. In addition to rising temperatures, climate change is likely to be accompanied by a variety of impacts, including rising sea levels, intensified tropical storms, and increased threats to biodiversity and human health (IPCC 2001a). Although the extent of the impacts will vary by location and depend on the magnitude and rate of warming (NAS 2001), developing countries and countries in transition are expected to be particularly vulnerable to climate risks.

The potential for adverse impacts from climate change and variability creates two challenges for USAID program and project managers and staff. First, climate variability and change presents a challenge in how to design programs and projects in order to prevent any adverse impacts from eroding the benefits of USAID investments. The second challenge is how to ensure that certain types of USAID activities do not contribute to maladaptation—i.e., some USAID project activities could make it more difficult for human or natural systems to successfully adapt to climate variability and change.

The literature on adaptation stresses the urgency of mainstreaming climate change and variability into development programs. Unfortunately, much of the guidance on the subject of adaptation is presented in a format that is more appropriate for climate professionals than for members of the aid community that are designing programs and projects targeted toward developing countries and countries in transition. Although formal approaches are more likely to ensure optimal results, they are also likely to be the most appropriate only in cases in which the level of investment is sufficiently high to justify expenditures on the additional resources needed to conduct complex formal analyses.

Formal and complex procedures and analyses are not likely to be necessary for many (if not the majority) of the decisions that must be made by USAID program and project managers. Armed with basic information about the threats climate change poses for the regions and activities included in their projects, managers can identify risks, assess their options, and devise effective adaptive solutions without overly in-depth analyses. The outcomes might not be optimal in all cases, but they will almost certainly be better than could be expected if climate impacts are not considered.

This paper provides four recommendations for ways of incorporating adaptation to climate change into USAID programming. The recommendations are based on an analysis of four recent USAID projects:

- Morulem Irrigation Scheme, Phase II
- Zimbabwe Natural Resource Management Project
- Cairo Air Improvement Project (CAIP)
- El Salvador Surface Water Diversion, Storage, and Use Project (SWDSU)

All four projects are vulnerable in some way to climate change. The extent and types of vulnerabilities vary, but they demonstrate considerable overlap as well (see Table ES1). Each project deals with the problem of periodic droughts or dry seasons with little to no rainfall. Three of the projects are subject to problems with periodic flooding. Two face soil erosion and sediment loading in water bodies, and two are vulnerable to extreme weather events such as cyclones.

Table ES1. Examples of climate vulnerabilities faced by USAID projects

Potential Climate Vulnerability	Morulem Irrigation Scheme	El Salvador SWDSU	Zimbabwe Natural Resource Mgmt. Project	Cairo Air Improvement Project
Droughts or seasonal dry periods with little to no rainfall	X	X	X	X
Periodic flooding	X	X		X
Soil erosion/ sediment loading	X	X		
Extreme weather events (e.g., cyclones, tsunamis)		X	X	

Based on findings from the case studies reviewed, four specific recommendations are proposed for improving USAID's approach to addressing the potential risks associated with climate change and variability.

- **Raise awareness among USAID managers and staff about the risks associated with climate change.** Providing basic information on risks associated with climate change through seminars, on-line training sessions, or even an easily understood primer could help USAID managers and staff recognize and address climate risks in project designs.

- **Screen projects and project activities for climate sensitivity.** Creating and providing a basic project screening tool that allows USAID managers to quickly identify projects and project components that are the most dependent on climate, or the most vulnerable to changes in climate, will help them determine early on the extent to which climate variability and change will be a key concern for their projects.

- **Introduce climate change impact considerations at key decision or intervention points.** The projects reviewed for this study suggest a number of points in project design and implementation stages that can provide opportunities for managers to address the risks from climate variability and change. Specifically, climate can be addressed during the initial project planning phase; as part of stakeholder interaction; and as components of environmental evaluations, assessments, and impact statements. Where the screening process indicates a potential for significant climate risk, managers should use one or more of these opportunities to address adaptation.

- **Provide access to adaptation expertise.** In situations where complex analyses are likely to be required and budgets are adequate, USAID program and project managers would benefit from access to internal or external experts with the qualifications required to conduct more detailed formal analyses and to help devise plans that will increase the resilience of USAID activities.

The level of effort needed to routinely address potential risks from climate variability and change is not likely to be onerous. Many of the basic policies, procedures, and practices that are already widely used by USAID program and project managers are well-suited for addressing near-term adaptation. Thus the first three recommendations provide a solid starting point for many of USAID's projects. The recommended steps are likely to be sufficient for program and project managers to recognize potential sources of climate risk, assess the likely importance of those risks within the context of their specific projects, and identify and choose from among a range of adaptation options that could be put in place to help ensure the permanence of their projects' benefits.

USAID projects that are highly sensitive to climate change and require a medium- to long-term climate change planning horizon. The projects will also require significant technical input for adaptation decision support, including accurate information about local and regional climate change impacts. Large infrastructure projects or large-scale projects that involve critical fresh water or coastal resources are good examples. For these more complex situations, project designers will need to budget for and engage the services of internal or external experts with the skills to fully assess requirements for incorporating adaptation to climate change into their project designs.

CLIMATE CHANGE AND DEVELOPMENT ASSISTANCE

Within the context of its overarching development goals, USAID is working to integrate climate change adaptation into its development assistance activities. Climate variability and change pose potentially significant threats to the benefits of many types of USAID projects. Beyond rising temperatures, climate change is likely to be accompanied by rising sea levels, intensified tropical storms, accelerated desertification, increased threats to biodiversity, greater variability of rainfall, and a variety of other effects (IPCC 2001a). While the extent of the impacts will vary by location and depend on the magnitude and rate of warming (NAS 2001), developing countries and countries in transition are expected to be particularly vulnerable to these.

The possibility of adverse impacts from climate variability and change presents two challenges for USAID. The primary challenge is how to ensure that climate impacts do not erode the benefits of USAID programs and projects. Those who design and implement USAID projects need to be able to identify climatic vulnerabilities, assess their potential implications, and, to the extent possible, work around the risks by building resilience to potential climate impacts into their projects. An additional challenge is that certain types of USAID activities might contribute to maladaptation if climate variability and change are not taken into account in project design. For example, large infrastructure construction projects (new roads, dams, port facilities, energy sector development, or large-scale tourist accommodations) could impair the ability of natural systems to adapt in response to changing climatic conditions. Results from these activities could ultimately cause difficulty for human populations that depend on such species to sustain their livelihoods.

ADAPTATION OBJECTIVES AND MEASURES

Adaptation is the means through which human and natural systems cope with the impacts of climate variability and change. According to the Intergovernmental Panel on Climate Change (IPCC 2001b), requirements for high adaptive capacity include "a stable and prosperous economy, a high degree of access to technology at all levels, well delineated roles and responsibilities for implementation of adaptation strategies, systems in place for the national, regional, and local dissemination for climate change and adaptation information, and an equitable distribution of access to resources." The countries in which USAID is active fall short on many, if not all, of these requirements.

ADAPTATION MEASURES

The United Nations Development Program categorizes adaptation measures into three basic types:

- Sectoral measures address climate risks in specific sectors such as agriculture
- Multi-sectoral measures address risks that span two or more sectors
- Cross-sectoral measures are broad approaches to addressing climate impacts such as:
  - Education and training programs
  - Public awareness campaigns
  - Fiscal policies
  - Risk/disaster management
  - Research and innovations
  - Monitoring and communication programs

Source: Lim, 2005

The fundamental goal of adaptation strategies and measures for developing countries and countries in transition is to sustain and improve the livelihoods of poor people (IISD et al. 2003). Adaptation measures should help increase livelihood resilience—i.e., the capacity to withstand and respond to shocks and long-term systematic shifts caused by a changing climate. Building resilience involves strengthening assets such as knowledge, physical capital, and access to natural resources as well as improving access to external services such as infrastructure, transportation, communication, emergency relief systems, and markets.

At the project level, addressing potential climate impacts and designing appropriate adaptive responses entails an analysis of the specific circumstances in which the project will be carried out. For any particular activity, it is important to identify whether and where climate vulnerabilities might exist and to assess how sensitive the activity might be to adverse climate impacts. Once the extent of vulnerability is determined, identifying potential strategies for coping with the vulnerabilities and assessing the benefits and constraints associated with various options should be possible. A project-by-project approach is sometimes necessary because adaptation strategies that make sense for one place and its inhabitants might not benefit another group and could even be maladaptive (IISD et al 2003).

CONSTRAINTS TO UNDERTAKING ADAPTATIVE MEASURES

While the basic goal of integrating adaptation into USAID programs and projects has clear merits, physical and financial limitations as well as social, political, and institutional constraints might affect the extent to which adaptative measures can or should be pursued (Vergara 2006). Physical limitations on what can be accomplished via adaptation planning arise in situations where avoiding a particular type of harm is impossible—for example, crop damage from storm surge striking a small island state.

Financial limitations are also an issue in developing approaches to adaptation. For example, constructing a hospital that can withstand a storm of any intensity might incur exceptionally high costs per incremental benefit. Social and political constraints can also limit the feasibility of adaptation options. Solutions that appear technically sound ultimately might prove socially unacceptable or face significant local political opposition. Finally, the project area could have constraints on institutional capacity that limit the possible types of adaptative measures. Despite these challenges, adaptation need not involve a major shift in project goals and in several sectors can be done incrementally using a "no regrets" approach. Where these constraints can be overcome, integrating adaptation into USAID programs and projects could significantly enhance the long-term benefits flowing to the communities and individuals the agency is working to assist.

A recent analysis of the vulnerability of development spending at the Inter-American Development Bank (IDB) is indicative of the importance of accounting for climate change. A review of IDB's project portfolio for the years 2003 through 2005 showed that about one-third of its projects and nearly one-fifth of its annual budget is exposed to significant climate risks (Iqbal 2006). If similar proportions hold for USAID, the logical conclusion on fiscal grounds alone is to preserve the benefits of USAID projects in the face of climate variability and change.

A substantial body of literature stresses the urgency of mainstreaming climate change and variability into development programs (Huq et al 2003). The World Bank, United Nations, OECD, and numerous OECD nations that provide official development assistance are all engaged in developing formal approaches to addressing adaptation within the context of their aid programs. Unfortunately, much of the guidance to date on the subject of adaptation is presented in a format more accessible for climate professionals than members of the development community. The formal procedures and rigorous analyses that are often recommended place a high burden on development professionals, which might explain the relatively slow adoption of the suggested approaches.

Although formal approaches might be more likely to ensure optimal results, they are also likely to be the most appropriate only in cases in which the level of investment is sufficiently high to justify expenditures on the additional resources needed to conduct the complex analyses. Projects that involve the construction of large infrastructure such as ports, dams, and roadways are examples of cases in which additional spending to fully address adaptation are most likely to be justified.

Formal and complex procedures and analyses are not needed for many of the adaptation decisions that must be made by USAID program and project managers. Recommending such procedures could actually be counterproductive. With basic information about the threats climate change poses for the areas and activities included in their projects, USAID managers and staff can recognize risks, identify and assess possible options, and devise effective adaptive solutions without undertaking difficult, time-consuming, and costly in-depth analyses.

OVERVIEW OF ANALYSIS AND RECOMMENDATIONS

This paper provides four recommendations for ways of incorporating adaptation to climate change into USAID programming. The recommendations are based on an analysis of four recent USAID projects:

- Morulem Irrigation Scheme, Phase II
- Zimbabwe Natural Resource Management Project
- Cairo Air Improvement Project (CAIP)
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None of these projects specifically addressed climate variability and change. Moreover, none of the projects has been in existence long enough for all of the potential climate impacts to be evident. However, each project had key decision-points or discrete activities in which potential climate-change impacts could have been taken into account. The recommendations flow from an analysis of the decision points and how the projects and their outcomes might have been different had climate change been properly considered.

BASIC INFORMATION ON CLIMATE CHANGE AND VARIABILITY

USAID program and project managers would need basic information about the nature, magnitude, and potential consequences of climate change and variability to cover a very broad range of topics, but at a level of detail that is easily accessible to the non-climate professional.

Managers designing project activities for a specific country or region should be aware of predicted changes in climate variables such as rainfall and temperature extremes and the likely sensitivities of natural and physical systems to those changes. This type of knowledge is essential for managers to make informed decisions about whether and how to include adaptative measures in their designs, and when to bring in additional expertise to help with project design. For example, if a project is being designed for a region in which average temperatures are expected to rise significantly, then specifications for project components that could be sensitive to higher temperatures, such as mechanical equipment, should take rising temperatures into account.

It is not necessary for USAID managers to become experts in climate science and impacts. However, they do need to be aware of the types of threats climate change poses for the countries and/or regions in which they are working, the magnitude of those threats, and the extent to which the natural and physical systems affected by their projects are sensitive to predicted climate changes.

MORULEM IRRIGATION SCHEME

This section addresses Phase II of the Morulem Irrigation Scheme (MIS) that ran from 1997 to 2001 in the Lokori division of the Turkana district in northwestern Kenya. (See Exhibit 1). Phase I, lasting from 1992 to 1994, rehabilitated canals on 150 acres and expanded the scheme to cover 307 acres. The principal document used for purposes of developing the project description and analyses in this section was World Vision's "Final Evaluation of the Morulem Irrigation Scheme Project" (USAID, World Vision 2001).

Project Description

Phase II of the MIS continued and expanded on the work completed during Phase I of the project, focusing on improving household food security and ensuring long-term sustainability of the scheme.

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Exhibit 1: Map of Kenya. The Lokori Division is in the Northwest near the Rift Valley.

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The four main objectives of Phase II of the Morulem Irrigation Scheme were:

- To increase agricultural production to achieve adequate household-level grain production during years of normal rainfall to supply 80% of household food grain needs

- To ensure that all households have sufficient land resources (increasing the minimum land holding from ¼ to ½ acre) and yields to meet household food needs

- To maximize the effective utilization of food among Morulem households

- To enhance management and maintenance of scheme assets and activities by the beneficiaries

The program sought to achieve these objectives by doubling the land area allocated to participating households (1228 in total) for cultivation; providing technical assistance in agricultural production, marketing, household nutrition, water, and sanitation; and strengthening management and institutions.

Areas of Climate Vulnerability

The Lokori Division of the Turkana District is classified as arid and semi-desert. Annual rainfall ranges from 250 to 500 millimeters and average daily temperatures remain fairly constant around 36.5 degrees Celsius. Rainfall is expected to increase over most of the continent; however, the Horn region and southern Africa are projected to receive 10 percent less rainfall by 2050. Equatorial Africa is expected to be 1.4 degrees Celsius warmer by the same year.

Water comes from the Kerio River, which is seasonal. The water drains into Lake Turkana after a 40-kilometer journey through a flood plain of alluvium soils. Vegetation in the area is sparse, though acacia trees flourish along the river margins. The soil is predominantly sandy loam, which is slightly to moderately alkaline and generally nutrient-rich but low in nitrogen (IPCC 1997).

The Turkana District is prone to climate extremes and natural disasters. The region faced serious flooding in 1997 followed by a cycle of drought that reached its height in 2000. El Niño is cited as the cause of the floods and future El Niño events will likely cause a repeat of the flood/drought cycle. The drought reduced grazing land, livestock numbers, wild food sources, and crop success. Current climate variability combined with the uncertain changes in climate to come and the poor road and communications network makes the region particularly vulnerable.

The Turkana District is known for its nomadic pastoralists. Its people depend primarily on flocks of cattle, camels, goats, and sheep for survival. Pastoralists are susceptible to livestock raids from the neighboring Pokot people and local bandits. For most, this equals losing their only means of income and sustenance, and becoming completely destitute. If climate change leads to an increased occurrence of drought and depressed economic conditions, livestock raids could also increase. Providing people in the Turkana District with alternative livelihoods could save lives.

Residents of the region also cultivate crops on the flood plains along seasonal river basins. Crop producers rely on the residual moisture that is left when Kerio River floods its banks. The river carries a high sediment load (primarily silt and sand), which local farmers must remove after it enters the main irrigation canal and conveyance system. An increase in the sediment load due to changes in climate and rainfall patterns could substantially increase this workload or decrease land productivity and crop cultivation.

PROJECT APPROACH TO ASSESSING POTENTIAL CLIMATE IMPACTS

The project team took a "flexible, learning-based approach towards project planning," which they believe made a "significant contribution towards project success." Project evaluators believe the flexibility of the donor (USAID Title II Resources) made this approach possible. The MIS was initiated in 1979 by the residents of Morulem with assistance from the African Inland Church. It ran into trouble, however, by 1990 "due to shortcomings in the initial design, ineffective scheme management, lack of technical know-how, and declining soil fertility."

The initial project planning was "done at short notice within a limited time period" without sufficient time for in-depth consultations with local farmers. Extensive consultation of information on potential vulnerabilities to climate change or incorporation of local climate knowledge was likely not carried out during this initial planning stage. Detailed plans were created later, however, as project implementation progressed. The community and project staff were involved in ongoing planning efforts once the project was in the implementation stage.

Farmers participated in project implementation; project review; and planning sessions, surveys, and meetings, allowing significant opportunities for input of local knowledge and expertise on climate variability and past indigenous adaptation measures. However, project documents give no indication whether this type of information was exchanged or considered during project planning.

The initial proposal included consideration of climate variability, but only in terms of its potential negative economic impact. As stated in the final project evaluation, "the original project proposal suggested that support measures to alternative income generating activities should be explored, in order to cushion the impact of periods when adverse climatic conditions reduce agricultural production." But because this statement was made in the context of employment and income generating activities besides farming, it does not reveal a consideration of how to adapt agricultural systems to withstand adverse climatic conditions. Rather, it suggests that a decreased reliance on agriculture would lead to a more stable community.

Some project components did not explicitly discuss vulnerability to climate change and steps toward reduction, but still will aid in enhancing system resilience. The 2000 Kenya Soil Survey, based at the Kenya Agricultural Research Institute, concluded that salt and sodium levels were not critical yet, but might exceed crop tolerance limits if they continue to accumulate. Although soil fertility was considered adequate, maintaining and improving fertility was identified as a goal of the project.

World Vision then identified a number of interventions that would help achieve this goal, including planting trees with nitrogen fixing properties; deep tillage to allow plant roots to reach for nutrients at multiple levels[1]; crop rotation; intercropping; incorporation of crop remains; use of animal manure; and irrigation system design changes to reduce the amount of silt that enters the system. While these interventions were not identified as measures to address the potential impacts of climate change, improving soil fertility will enhance the resilience of the agricultural system to climate shocks.

PROJECT MEASURES TO ADDRESS POTENTIAL CLIMATE IMPACTS

Many project components were essentially climate variability adaptation measures, undertaken to improve system productivity and not explicitly to address climate change. The project encouraged establishing woodlots to allow excess water to drain out of the irrigation system. In addition to their drainage function, woodlots reduce the risk from flooding during extreme conditions of heavy rainfall and intense storms, supply firewood, and help preserve the natural tree cover. Tree conservation is meeting the end goals of the effort to promote the use of energy-efficient stoves, a measure that integrates both mitigation and adaptation. As Exhibit 2 shows, planting trees as hedge rows along canal banks and drainage canals has stabilized banks and created windbreaks. Preventing erosion and runoff through preservation of native species and tree planting will increase the resilience of the system to existing climate variability and future changes in climate.

USAID/WORLD VISION, INC. 2001

Exhibit 2. Trees planted along a drainage canal stabilized banks and served as windbreaks.

[1] Deep tillage could potentially be maladaptive if it leads to increased soil erosion.

Some species were promoted for their ability to help purify the water and control pests. Identifying and promoting species of this sort can provide immediate benefits as well as adaptive benefits. World Vision staff also encouraged crop diversification, which will better equip the community to survive droughts, pests, floods, and other unplanned and uncontrollable natural events. Finally, as mentioned previously, maintaining and improving soil fertility will ensure a more robust agricultural system.

LESSONS LEARNED AND OPPORTUNITIES FOR ADAPTATION

Staff received training to improve their ability to effectively implement the project. Training courses included a sustainability workshop, agriculture training, environmental impact assessment, and organic farming. These types of courses and the explicitly stated prioritization of training represent a potential intervention point for addressing climate change and adaptation in other projects.

The project manager also sat on the District Development Committee, which provided an opportunity for input into wider planning efforts. If the climate link had been made more explicit, and adaptation measures had been considered and incorporated into the MIS, this knowledge and experience could have been shared and incorporated on an even larger planning scale. The project also "cooperated with various governmental and non-governmental institutions." This kind of collaboration could prove valuable in disseminating information about climate change and adaptation and implementing adaptation measures outside the immediate project area.

When planning is done on short notice as with this project, project managers will have difficulty in consulting climate information that is not immediately on hand. Any action by USAID or other agencies to facilitate access and interpret climate information will ease incorporation of this knowledge into planning processes.

The project included interventions to improve soil fertility, such as tree planting and deep tillage methods. These types of interventions could provide opportunities to consider the integration of mitigation and adaptation. For example, certain tillage methods release more carbon dioxide than others and increase the soil erosion risk. Some trees also sequester carbon more efficiently and could be favored over others.

Water conservation is vital to the sustainability of the area now and in the face of future climate variability and change. Strategies that will conserve water further (e.g., conservation tillage, furrow planting, lining of the new main canal) will ensure water availability during low river flows.

EL SALVADOR SURFACE WATER DIVERSION, STORAGE, AND USE PROJECT

The El Salvador Surface Water Diversion, Storage, and Use (SWDSU) project took place during the eight-month period from July 2004 to January 2005 at various sites in El Salvador. The final project report provided the information used in preparing this section (USAID 2005).

Project Description

The SWDSU project team built 13 water systems that were designed to divert, store, and make economic use of surface water. Forty people benefited from the construction of these systems, which relied on horizontal-well type diversion (infiltration galleries) and off-channel excavated storage reservoirs. Sub-projects were designed to use and/or convert the stored water into income.

The project aimed to achieve three main objectives:

- Develop combined water diversion/storage systems for a minimum of 10,000 cubic meters of surface water in pre-selected areas (that had already undergone environmental assessments)

- Identify and establish income generating activities for program beneficiaries to take advantage of stored surface water

- Build local capacity to operate and maintain systems (USAID 2005)

Areas of Climate Vulnerability

El Salvador faces a seasonal six-month dry period in addition to *canigulas* (periodic drought conditions). Rainfall can begin late in the rainy season (such as in 1992, when rain began four months late) or become limited or nonexistent for periods of up to two months. Canigulas can ruin planted crops for the season and leave affected farmers with little or no option for producing another crop. These periods of drought could become more frequent or intense due to climate change.

Typically, small farmers in El Salvador are active economically only during the annual rainy season, because these are the only months during which they can cultivate land. During the dry season, they have no reliable source of usable water if diversion and storage systems are not in place. If these dry seasons occur more frequently or last longer, this period of economic inactivity could lengthen correspondingly and threaten the livelihood of small farmers.

USAID 2005

Exhibit 3. Project managers discuss the irrigation systems with project beneficiaries.

Surface waters in El Salvador not typically seen as a resource by local populations, becauses they are often contaminated with solid and liquid wastes that travel downstream, negatively impacting populations and the environment. Additionally, years of deforestation have caused soil erosion that has led to sediment loading in surface waters. Climate variability in the region has been tied to the El Niño phenomenon and the Southern Oscillation, which affect pressure systems, temperature, rainfall, lake levels, and river discharges. The higher high flows or lower low flows that might result from climate change could seriously imperil these already impaired waters (IPCC 1997).

PROJECT APPROACH TO ASSESSING POTENTIAL CLIMATE IMPACTS

The project identified 12 sites for construction of reservoirs and irrigation systems. These sites were selected from 15 pre-screened sites, chosen based upon previous USAID interventions. The project team undertook a topographic survey and an assessment of the amount of water needed to cultivate crops. The team then produced a design manual to explain the criteria and assumptions relied upon in designing the size of the reservoirs and irrigation area. The team also considered environmental assessments and risk mitigation plans that had been completed for earlier projects. How water availability might change as a result of climate change does not appear to have been a consideration.

The project team worked with farmers to make decisions about which crops and other income-generating activities should be undertaken with the stored water. This collaborative approach made it possible to capitalize on local knowledge about the types of crops and activities that are most likely to thrive in local conditions. However, the project documents do not indicate whether the potential impacts of climate change were considered.

Project designers considered the potential impacts of earthquakes and flooding on the system. The off-channel reservoir was used in the system to avoid the hazard of a catastrophic breach from extreme events, poor construction, or sabotage. Although natural disasters were considered in the design phase of the project, the impacts that climate change might have on the frequency and severity of such events do not appear to have been considered.

Erosion was clearly a concern to project designers, and "minimizing sediment loading in the stored water" was identified as an issue of "vital importance." The infiltration gallery was stabilized against stream erosion through construction of a gabion (Exhibit 4). However, designers did not seem to consider how the gabion could stand up to higher than normal levels of soil erosion that might occur as a consequence of climate change. Similarly, discussions of the system design address "anticipated suspended

USAID 2005

Exhibit 4. Gabions were constructed to stabilize the infiltration gallery against stream erosion.

sediment load," but no indication is made of how this anticipated load was calculated or whether potential increases in sediment load due to climate change were considered.

PROJECT MEASURES TO ADDRESS POTENTIAL CLIMATE IMPACTS

In an effort to prevent erosion in hilly areas, the project team provided hands-on training in soil conservation practices. While these training sessions were not prompted by a concern that climate change might cause increased soil erosion, they addressed mitigation measures that could be taken, such as building hillside ditches to divert water and planting grass with long roots to create protective barriers.

LESSONS LEARNED AND OPPORTUNITIES FOR ADAPTATION

The project produced 20 documents to train farmers and field technicians in the management of systems and crop production techniques. Such documents could include information and guidance on considering climate change and the need to adapt as conditions change. The documents could also address the types of impacts to expect and possible measures that could enhance the resilience of the system.

Similarly, the project established four demonstration sites, where project staff could provide information on the risks posed by climate change and ideas for adapting. Exchanging information at these demonstration sites could provide opportunities for farmers to contribute knowledge about past indigenous adaptation. An exchange of ideas and heightened awareness could improve a community's capacity to adapt.

Project team members worked with the project beneficiaries to determine the best use of the stored water in terms of crops and other income generating activities. Whether they considered the impacts of climate, and how they might adapt these activities to cope with climate change, is unclear. Considering climate at this step of project planning would be a good opportunity to identify possible climate risks, discuss autonomous or indigenous adaptation, and consider what types of adaptation measures could be incorporated into the project design. Hands-on training sessions to teach farmers methods for soil erosion control could also provide opportunities for discussion and dissemination of information on climate change, its potential impacts, and possible adaptation measures.

The final project review pointed out that "it would have been ideal if the project had been able to identify potential construction sites rather than work from a list of pre-selected sites [based on previous USAID interventions]." The selection of project sites might be a good time to incorporate adaptation considerations into project planning as well.

The horizontal well system is designed to direct excess inflow back to the natural stream by way of an overflow pipe spillway. How much excess inflow the system can handle, and what maximum excess levels were considered during the design of the systems, are unclear. Similarly, the infiltration gallery is not expected to wash out if placed above a "natural knick point in the stream profile or above a reinforced structure, such as a gabion." Climate change could result in much higher high flows, which might exceed design assumptions. Project designers might have to rethink design assumptions in the face of potential changes in climate.

ZIMBABWE NATURAL RESOURCE MANAGEMENT PROJECT

USAID began Phase I of the Zimbabwe Natural Resource Management Project (ZNRMP) in 1989 and continued work in Phase II of the project, which ran from 1994 to 2003. The midterm evaluation (USAID 1994) and final report (USAID 2004b) as well as the report USAID prepared for the Senate Appropriations Committee (USAID 1998) were used to gather the information and conduct the analyses presented in this section.

Project Description

Through the ZNRMP, USAID sought to "increase incomes and enhance the capability of communities to meet basic human needs through sustainable utilization and conservation of natural resources, particularly wildlife." The project was designed to support a Zimbabwe-based program called CAMPFIRE (the Communal Areas Management Program for Indigenous Resources), which aims to "use natural resources to develop economically sustainable communities on lands marginally suitable for agriculture." A two-fold purpose guided the project from its outset:

- To demonstrate, through practical examples, the technical, social, economic and ecological viability and replicability of community-based natural resource management and utilization programs on marginal lands for increasing household and community incomes while sustaining natural resources

- To improve national and local capability to halt the decline in the wildlife resource base through training, education, protection, communication, and technology transfer

The project included four broad components: community-based resource management and utilization, planning and applied research, wildlife and natural resource conservation, and regional communications and information exchange. Phase I of the program focused heavily on monitoring and managing elephant populations, but Phase II placed a diminished emphasis on elephants and instead aimed to monitor multiple wildlife populations and habitats.

Areas of Climate Vulnerability

The project area is hot and low-lying, with mean annual rainfall between 450 and 650 millimeters. The land is best suited to animal husbandry and wildlife when not irrigated. Irrigated land can support sugar cane and wheat. The land is marginally suitable for rain-fed maize. Droughts frequently plague the area, and hit particularly hard from 1982 through 1984. Climate change could increase the frequency and severity of drought periods.

Some project funding was used to reconstruct a road to an ecotourism site after damage by a cyclone. Cyclones are an additional threat to the area and could become a more severe threat under some climate change scenarios. Additionally, food shortages in rural areas were noted in the project documentation. What role, if any, was played by climate-related factors in creating the food shortage problem is unclear.

PROJECT APPROACH TO ASSESSING POTENTIAL CLIMATE IMPACTS

Potential climate impacts were not discussed in any of the project documents reviewed. The environmental assessment conducted for the project's proposed activities was described as "superficial" and a cause for concern about the "sustainability of infrastructure." Mid-term project evaluations recommended that environmental assessments should be conducted for construction of infrastructure such as large dams and reservoirs; irrigation, drainage, and flood control; and land clearance and leveling. Apparently, basic environmental considerations, let alone assessments of potential climate impacts, were not undertaken.

Even though climate change does not appear to have been considered, it is likely to impact many of the project's activities. Grant money was given for construction of camping facilities, water reticulation, and sewage works—activities that could all be affected by climate change. Potential climate impacts were not mentioned in the descriptions of any of these grant activities.

One of the grant projects that involved the construction of campsites and chalets for tourists was located on the banks of the Kairezi River, which is renowned for its trout fishing. Fisheries habitats are sensitive to potential effects of climate change, including temperature and precipitation variability, which can affect water temperatures, stream flows, surface water levels, and the composition of shorelines. These alterations could adversely impact the fish populations that attract tourists to this site, and in turn, interfere with the sustainability of this ecotourism project.

Another grant funded the establishment of four fishing camps on a dam and enabled cooperatives to harvest and market sustainable catches. Climate change could similarly impact this grant activity, but apparently it was not considered. (IPCC 1997).

PROJECT MEASURES TO ADDRESS POTENTIAL CLIMATE IMPACTS

The project did very little to address potential climate impacts. Long-term planning efforts focused more on the financial self-sufficiency of the project and less on its environmental sustainability.

One grant project that involved erecting seven circular electric fences to control problem animals took special care to ensure that project plans included the preservation of game corridors. The project sought to encourage game movement in unpopulated areas, but not to halt movement altogether. Maintenance of species corridors will become increasingly vital as climate changes and, subsequently, habitats change. Game and wildlife will need to be able to move in order to adapt to changing conditions. Although this project did not explicitly set aside corridors for their adaptive value, it did ensure that species will have a better chance of survival in the face of climate change and variability.

Other project activities focused on provision of water for wildlife populations, usually with the goal of reducing human/animal conflict. Again, the actions taken to establish watering points could help as species face more dramatic swings in water availability, but were not taken as measures to adapt to climate change.

LESSONS LEARNED AND OPPORTUNITIES FOR ADAPTATION

The project provided training programs on topics such as project design, proposal development, organizational development, and project management. These types of training programs would have been good opportunities for discussing and advising project participants on how to incorporate adaptation considerations into planning.
The final report points out that community participants were not always consulted fully in the project planning stage. The mid-term report acknowledges that, "project implementation is rarely from the bottom-up" (i.e., "in response to problems identified by individuals, groups of individuals, and villages directly affected by wildlife"). Involving community project participants creates an excellent opportunity to acquire local knowledge that might enhance efforts to adapt to a changing climate. Local expertise and historical knowledge can prove invaluable in designing adaptation measures.

The ZNRMP is part of a larger regional project involving three other countries: Malawi, Zambia, and Botswana. This regional focus and the forum for discussion that it presents creates an opportunity to share information on any specific adaptation measures that are incorporated into a single project and to share additional information on adaptative needs and options at the regional level.

The project also includes a partnership with the University of Zimbabwe's Centre for Applied Social Sciences (CASS), which undertook research and advisory activities. Project reviewers criticized CASS for not conducting "needs-driven research appropriate to the project" and expressed concern that CASS focused too heavily on basic research rather than applied research. The participation and collaboration of a research entity like CASS presents a potentially important opportunity for an analysis of adaptation options during the project period. For example, as mentioned earlier, some project funding was used to reconstruct a road to an ecotourism site after the road was damaged during a cyclone. An analysis of the nature of the damage and possible strategies to enhance the resilience of infrastructure could point to appropriate adaptation measures that could be included in project planning.

CAIRO AIR IMPROVEMENT PROJECT

The Cairo Air Improvement Project (CAIP) was undertaken to address air pollution and related human health issues in Cairo, Egypt. The final project report provided the basis for the discussion in this section (USAID 2004a).

Project Description

CAIP was in operation for nearly seven years, from May 1997 through March 2004. It was the first donor-assisted program created to address directly the air pollution problems in Cairo. Major components of the program were planned and undertaken in order to achieve the following objectives:

- Reduce lead exposure by improving process and emission controls at smelting operations in and around the city of Cairo

- Reduce total suspended particulate matter by implementing a pilot project to convert part of two municipal bus fleets to compressed natural gas (CNG) and to undertake technical analyses and a policy dialogue on how to reduce plant emissions at cement plants and other industrial facilities

- Institute an air quality monitoring program to assess the impact of project interventions on Cairo's air quality

- Implement an emissions testing program for road vehicles operating within the city of Cairo

- Develop and launch a public awareness and communications campaign designed to enlist support for air improvement activities among key stakeholders in Cairo and elsewhere throughout Egypt

CAIP activities took place within the context of five main focus areas: clean alternative transportation fuels; vehicles emissions testing; lead pollution abatement; air quality education and public awareness; and monitoring and analysis.

Areas of Climate Vulnerability

Cairo, a mega-city of more than 15 million inhabitants, is located on the Nile River at the edge of the Sahara desert. Its climate is characterized by dry and hot summers, mild winters, and sparse rainfall. Severe wind and sand storms pose more significant threats than extreme precipitation events. Climate model estimates of temperature and precipitation changes for Egypt indicate that by 2050, annual mean temperatures could rise by less than 0.25 percent. However, a more significant change could occur in terms of annual rainfall. Specifically, estimates indicate the potential for annual precipitation to decline by nearly 11.5 percent (Agrawala et al 2004).

Any increase in the duration, frequency, and/or severity of wind and sand storm events associated with climate change is likely to pose the most serious threat to project benefits. Strides made in terms of reducing airborne particulates emitted by vehicle traffic could be overshadowed by an increase in particulates due to an increase in sand and wind storms (

Exhibit 5). Other potential sources of leakage of benefits could develop as a result of an increase in rural-urban migration if a persistent shortfall in annual precipitation reduces income earning potential

USAID 2004A

Exhibit 5. The economic valuation of health risks clearly demonstrated the significance of particulate matter versus other pollutants.

within the agricultural sector in Egypt. An inflow of new migrants into Cairo could increase pressures on the urban transportation sector and result in some reversal of the air quality benefits realized as a result of CAIP.

Two upgraded maintenance garages with CNG fuelling stations, a renovated industrial waste landfill, a new emissions testing facility, and a new lead smelting facility all constructed as part of CAIP activities might also be somewhat susceptible to impacts from climate change. In general, infrastructure projects can be affected by changes in climate in a variety of ways. For example, in areas where flooding might be a problem, industrial landfills need to be sited and then constructed so as to avoid leakage of hazardous substances into ground and surface water. Likewise, where extreme weather events could become more severe or more frequent, construction methods need to be updated to take into account the potential for weather-related damages to structures. Whether the infrastructure components of the CAIP are or could be vulnerable to these or other types of adverse climate impacts is not clear from available documentation.

PROJECT APPROACH TO ASSESSING POTENTIAL CLIMATE IMPACTS

Assessing potential climate impacts was not a central concern in CAIP activities. Climatic conditions did arise as an issue in the design and manufacture of a fleet of 50 CNG buses, a measure that represented the cornerstone of CAIP efforts to introduce clean fuels into the Cairo mass transportation system. CAIP facilitated cooperation among bus companies in Cairo and engineers in Egypt and the United States to design a CNG vehicle that would satisfy the requirements of mass-transit consumers in the Cairo market while remaining reliable and cost-effective for bus companies. One of the key design features addressed by the engine manufacturer related to the need for greater cooling capacity in order to make the engines suitable for operating in Cairo's hot climate. Extensive collaboration on this and other design features resulted in a finished product that was "viewed by all parties as a remarkable achievement."

PROJECT MEASURES TO ADDRESS POTENTIAL CLIMATE IMPACTS

Although the impacts of climate change were not directly addressed by CAIP, the project did implement a variety of measures that could be instrumental in helping the city of Cairo ensure that the benefits from CAIP are perpetuated despite potential impacts from future climate change and variability.

A key challenge recognized by CAIP was the need to ensure that the new CNG bus fleet would remain operational. In response to this challenge, CAIP designed state-of-the-art garages and trained local technicians to provide maintenance and repair services for the new fleet of CNG vehicles. Both the new facilities and the local expertise can be instrumental in avoiding adverse impacts from climate change on the CNG fleet.

CAIP worked with the Ministry of Petroleum in Egypt to build a world class emissions testing and performance research center in Cairo. The Misr Lab, as the facility is known, is one of only nine such labs in the world and is the most sophisticated facility of its kind in the Middle East and Africa. The lab is equipped and staffed to check vehicle and new equipment performance (Source: **USAID 2004A**


SOURCE: USAID 2004A

Exhibit 6. State-of-the-art Misr Lab provides Egypt with unique capability to evaluate vehicle emissions and performance.

Exhibit 6). The results of its research could be important in ensuring that new vehicle designs continue to result in reduced emissions under changing climatic conditions.

An emissions testing and vehicle tune-up program under CAIP worked with mechanics shops, the Minister of State for Environmental Affairs, local governorates, and stakeholders throughout the region to implement a large-scale voluntary program aimed at reducing emissions from road vehicles. Part of this effort involved increasing public awareness about air pollution, its sources, and solutions. CAIP worked with educators and the local press and even went door-to-door providing fact sheets to more than 800 neighborhood garages. These networks and information dissemination methods could be valuable in assisting mechanics with obtaining information about techniques for improving or ensuring the low-emissions performance of road vehicles under future climate conditions.

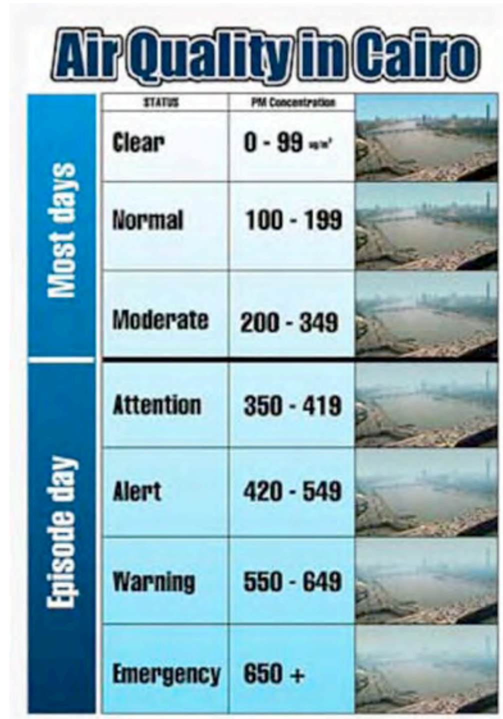
Monitoring and analysis programs were established by CAIP to provide decision makers and others with key information about the performance of CAIP initiatives. Because continuous monitoring and analysis programs can identify changes and trends in air quality, these programs will help ensure that program benefits are not reversed with climate change by pointing out the need for new or more stringent measures to address air quality.

LESSONS LEARNED AND OPPORTUNITIES FOR ADAPTATION

While rainfall is forecasted to decrease over time in Cairo, extreme rain events could continue to strike occasionally and threaten the infrastructure investment made as part of the activities under CAIP. Project resilience to potential damages resulting from flooding might have been enhanced if considerations of the potential for an increase in the severity or frequency of flash flood events had been considered in selecting sites and construction methods when infrastructure investments were planned.

CAIP demonstrated outstanding flexibility in program design and implementation in several instances. The most notable example is the response to serious air pollution episodes that became apparent after CAIP was designed and activities began. In the fall of 1999, air pollution episodes that locals call the “black cloud” were first observed in Cairo. The project amassed data and conducted analyses to determine the composition and sources of the black clouds, and solutions aimed at episode management and reduction, such as creation of a new air pollution forecasting unit within the government, were added as the project progressed. The ability to identify changing circumstances and develop effective responses is a key requirement for ensuring resilience under changing climatic conditions.

Public education and awareness-raising campaigns can be important elements in efforts to build adaptive capacity. CAIP's highly successful approach of enlisting a broad array of groups and individuals, particularly the popular press, in helping disseminate information on the sources and consequences of poor air quality in Cairo was instrumental in creating a political environment in which it was possible to implement key changes, such as the introduction of mandatory emissions testing (Exhibit 7). The project's overall approach to data collecting, presentation, and dissemination might work well in an adaptative capacity building setting.



SOURCE: USAID 2004A

Exhibit 7. CAIP designed a simple scheme to classify air quality and air pollution episodes for communication to the public.

In some situations, there could be conflicts or trade-offs between project goals and adaptation strategies (Agrawala 2005). The Cairo Air Improvement Project conducted an extremely effective public education campaign that was instrumental in helping to overcome political concerns about implementing a mandatory vehicle emissions testing program. The campaign enlisted the help of members of the popular press, who disseminated information on the relationship between vehicle emissions, air quality, and human health effects through widely distributed newspapers and local television and radio stations. Although climate change information could have been distributed at the same time, it probably would have been unwise to do so. Including information on climate change could have diluted the message and reduced the effectiveness of the campaign.

In addition to its work to raise public awareness, CAIP also made very wise investments in improving awareness among officials and political leaders at all levels of government. CAIP "recognized early in the planning stages" that political resistance could present a formidable constraint on achieving program goals in the vehicle emissions testing element of the project as well as in the siting of the new lead smelting facility. By investing in research to better understand the political landscape, CAIP was able to forge successful partnerships with key government leaders, which greatly facilitated accomplishing its goals. Similar up-front efforts aimed at developing a full grasp of the political constraints could be quite valuable for planning and implementing an adaptation strategy.

SUMMARY AND RECOMMENDATIONS

Although none of the projects reviewed for this study explicitly addressed adaptation concerns or climate change, all of the projects are vulnerable in some way. The types of vulnerabilities mentioned in project reports varied to some degree but demonstrate considerable overlap as well (see Table 1). All of the projects must deal with the problem of periodic droughts or dry seasons with little to no rainfall. Three of the projects are subject to problems with periodic flooding. Two face soil erosion and sediment loading in water bodies, and two are vulnerable to extreme weather events such as cyclones.

Table 1. Examples of climate vulnerabilities faced by USAID projects [2]

Potential Climate Vulnerability	Morulem Irrigation Scheme	El Salvador SWDSU	Zimbabwe Natural Resource Mgmt. Project	Cairo Air Improvement Project
Droughts or seasonal dry periods with little to no rainfall	X	X	X	X
Periodic flooding	X	X		X
Soil erosion/ sediment loading	X	X		
Extreme weather events (e.g., cyclones, tsunamis)		X	X	

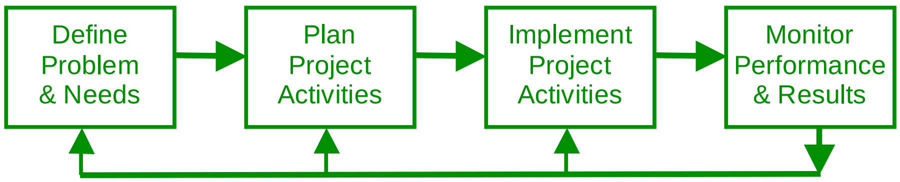
The diagram on the following page illustrates the four fundamental stages in all USAID projects. Climate change and adaptative responses are potentially applicable to each of these stages. For example, the first stage in developing a new project involves undertaking the basic research and consultations needed to accurately define the specific problem being addressed by the project and outline methods of addressing the problem. At this juncture, climate change should be considered so that project designers have the opportunity to recognize early how climate impacts might affect attainment of project goals.

If potential climate impacts are determined to be significant enough to require attention, climate change impact mitigation activities would be built into the project design during the second stage: project planning. During the third stage of project implementation, climate change adaptation measures would be put in place along with the other measures

[2] The set of climate vulnerabilities this group of projects is subject to does not represent an exhaustive list of the threats posed by climate change. It indicates only the vulnerabilities identified in reviewing the projects examined for this paper. USAID projects will likely face many other climate vulnerabilities, including such difficulties as declining access to aquatic ecosystem resources, human susceptibility to insect-borne diseases, degraded or disappearing coastlines, and a variety of other risks.

of the project plan, in order to ensure sustainability of project outcomes. Finally, monitoring and evaluation activities undertaken in the fourth stage would encompass assessment of the amount, placement, and effectiveness of climate change adaptation measures.

USAID Project Stages



Although no mention is made of the specific activities undertaken during the problem and needs identification stage, the description of planning processes in the four projects reviewed for this paper suggested that there are several good opportunities to incorporate climate information: as part of the initial environmental examination (IEE) and subsequent environmental assessment or environmental impact statement, and during consultation with local stakeholders. In accordance with USAID Regulation 216, all of the projects conducted environmental examinations at some point in the planning process.[3] This requirement presents an excellent intervention point for incorporating issues related to climate variability and change.

However, because current guidelines entail assessing only the impacts of the projects on the environment and not the potential impacts of the environment on the project, some changes in standard procedures might be needed to ensure that climate change and adaptation are considered.[4] Moreover, standard methodologies used in conducting environmental assessments would need to be revised to include analyses of climate variability and change (Agrawala 2005).

The case studies conducted for this analysis make clear that USAID routinely enlists many types of procedures, processes, and problem-solving approaches that are well-suited for incorporating considerations of potential climate risks to project benefits. Clearly, on the whole, USAID managers, staff, contractors, local stakeholders, and partners were all committed to the success of the projects or project elements in which they were involved.

Finally, it was apparent that USAID managers and staff are skilled at identifying obstacles, evaluating options for overcoming those obstacles, and creating workable solutions for a very broad range of issues. These characteristics suggest that merging

[3] Although environmental assessments had been completed previously for areas receiving assistance through the El Salvador SWDSU, climate change considerations could still have been incorporated into the existing assessments at the point when they were reviewed.
[4] Since many types of USAID programs and projects might not be affected by climate change, it might not be necessary to impose a strict requirement that climate must always be a factor in conducting an environmental assessment. However, if the basic screening process recommended here determines that climate could pose a significant threat to program or project benefits, then revised guidance on environmental assessments and environmental impact statements would be particularly valuable in helping USAID managers design appropriate measures.

adaptation into USAID programming will likely require only incremental changes in the way USAID managers and staff plan and implement projects.

With this in mind, we offer four specific recommendations for improving USAID's approach to addressing the potential risks associated with climate change and variability.

- Raise awareness within USAID about the risks associated with climate change
- Screen projects and project activities for climate sensitivity
- Introduce climate change impact considerations at key decision or intervention points, including
  - — initial project planning
  - — environmental examinations, assessments, and impact statements
  - — stakeholder interactions
- Provide access to adaptation expertise

The first three recommendations provide a solid starting point. For many types of USAID project activities, these steps might be completely sufficient for program and project managers to address climate risks. Some USAID projects (e.g., large infrastructure projects or large-scale projects that involve critical fresh water or coastal resources) will require more in-depth approaches, and program and project managers will need access to additional expertise to identify and assess the full range of climate impacts and adaptation options. Each of the four recommendations is discussed more fully below.

This set of recommendations could be voluntary or required. USAID managers are already required to take into account a wide array of factors in project planning and implementation. Consequently, we recommend introducing adaptation to climate change and variability as a voluntary step initially and as a requirement later, after some experience has been amassed.

RAISE AWARENESS WITHIN USAID ABOUT THE RISKS ASSOCIATED WITH CLIMATE CHANGE

Basic information about climate change and the future risks it poses to USAID programs and projects is vital to merging adaptation into project planning. Without a base level of knowledge and awareness of the risks, identifying adaptation options and successfully incorporating them into project activities will be difficult to impossible. Increasing awareness about projections of future climate change, the possible impacts of those changes, and adaptation measures that might be taken is the logical first step to incorporating adaptation at a programmatic level. Seminars, online training sessions, or even an easily understood primer on climate change are all potentially effective means of increasing the overall level of understanding about climate impacts and the importance of considering adaptative measures.

SCREEN PROJECTS AND PROJECT ACTIVITIES FOR CLIMATE SENSITIVITY

Certain types of USAID projects and project activities will be more sensitive to climate than others. Identifying projects and project components that are the most dependent on climate or the most vulnerable to changes in climate, particularly during the project definition and planning stages, will help to direct resources effectively and efficiently. A basic project screening process that offers guidance for when to consider climate change and what types of climate sensitive decisions might arise in particular projects would be especially helpful to USAID managers engaged in planning and implementation. The screening process should take into account: (1) regional sensitivities to projected climate impacts; (2) project types that are likely to be most sensitive to climate risks; (3) timeliness, in terms of project lifetime or decision timeframe; and (4) irreversibility of decisions (taking into account financial investments and environmental impacts).

INTRODUCE CLIMATE CHANGE IMPACT CONSIDERATIONS AT KEY DECISION OR INTERVENTION POINTS

Initial Project Planning

The problem definition stage and early on in the project planning stage present the best opportunities to incorporate climate information, assess the costs of including adaptation measures, evaluate the potential costs of inaction (e.g., maladaptive outcomes and the costs of addressing those outcomes), and adjust project plans accordingly. These are appropriate stages for considering design assumptions (such as whether or not traditional designs will be able to withstand changing climate conditions) and future availability of resources (water, cropland, fertile soil).

Environmental Examinations, Assessments, and Impact Statements

The process of conducting an environmental evaluation as part of the evaluation and monitoring stage also offers a potentially important opportunity to insert considerations of climate change. Although the environmental examinations, assessments, and impact statements currently required under Regulation 216 refer only to the impacts of a project on the environment, adding a component to each that considers the impact of the environment (and future changes) would be relatively easy. All of the projects reviewed for this report conducted environmental assessments. Inserting climate change considerations into this well-established process should help USAID achieve the goal of incorporating adaptation into project planning at a programmatic level while assessing the particular vulnerabilities and appropriate coping strategies at the individual project level.

Stakeholder discussions

Most of the projects reviewed included some component of stakeholder interaction—typically in the form of discussions about project plans, but also as part of the activities undertaken during the implementation. This type of interaction provides an excellent opportunity for tapping into local expertise and historical site-specific knowledge that could be vital for crafting an effective adaptation strategy. Consulting with stakeholders will help to circumvent the social and political barriers that could block adaptation strategies crafted in isolation from the people who are most familiar with a particular project site. In addition, missions could be encouraged to either incorporate climate risks into their interactions with existing strategic objectives teams or to form teams that directly address adaptation issues and options.

Lastly, and perhaps most importantly, USAID managers are likely to have opportunities to interface with local, national, and regional government institutions that affect planning decisions, which could influence the success of adaptative measures.

PROVIDE ACCESS TO ADAPTATION EXPERTISE

While the previous recommendations will assist USAID managers in accounting for climate risks in their projects, a layperson's understanding of the issues and risks will not be adequate for some types of projects and project activities to ensure that project benefits will be preserved in the face of climate variability and change. The basic screening process recommended above as part of the problem definition or project planning stage will help managers recognize the need for additional expertise. Classic examples are the large infrastructure projects implemented in regions of the world where climate risks are particularly high. For these types of activities, developing an effective approach to adaptation will require input from experts capable of fully evaluating the risks, identifying appropriate options, and rigorously assessing those options to produce a well-planned strategy for ensuring the success of the project. USAID could assist its managers in locating this type of expertise by maintaining a list of individuals and/or firms that have the qualifications to conduct these types of detailed analyses.

> "In many instances, rather than requiring radically new responses, climate change might only reinforce the need for implementation of measures that already are, or should be, environmental or development priorities. Examples might include water or energy conservation, forest protection and afforestation, flood control, building of coastal embankments, dredging to improve river flow, and protection of mangroves."
>
> *Source: Agrawala 2005*

CONCLUSIONS

The literature on adaptation to climate is substantial and growing rapidly, especially in the area of mainstreaming climate impacts into planning in developing countries and countries in transition. Unfortunately, much of what has been written is heavily focused on complex and often rigorous approaches to assessing adaptative needs and is not accessible to those who are not climate professionals.

While rigorous methodologies have their place in the field of adaptation, assuming that these are the only potentially effective approaches is a mistake. Significant strides in terms of enhancing resilience to climate change can be achieved through relatively simple steps. Armed with basic information about possible climate impacts and sensitivities, USAID program and project managers and staff should be able to devise effective common sense approaches to most adaptation needs. Some of the solutions might not be optimal, but certainly they would be preferable to not addressing the issue.

Given the agency's global reach and the diversity of projects it undertakes, USAID is well positioned to play an important role in integrating climate change and development. Based on the projects reviewed for this study, the level of effort needed to routinely address potential risks from climate variability and change will not necessarily be onerous. Many of the basic policies, procedures, and practices that are already widely used by USAID program and project managers are well suited for addressing adaptation. Environmental assessments and stakeholder interactions are two important examples.

For most types of projects, the changes needed are more at the margin, as opposed to full-scale revamping of existing approaches. Increasing awareness of climate risks, providing basic screening tools to help USAID managers and staff quickly identify climate sensitivities, and adapting existing practices to include consideration of climate impacts could significantly improve the resilience of most types of USAID projects. For projects where climate sensitivities are high and adaptation options are difficult to identify and/or assess, providing information on where to access the required expertise would significantly assist USAID managers.

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